



True-RMS

Digital Clamp-on AC/DC Multimeter



*Thank you for purchasing your True-RMS Digital Clamp-on AC/DC Multimeter from **RadioShack**. Please read this user's guide before installing, setting up, and using your new multimeter.*

Setup

Package contents

- Multimeter
- K-Type Thermocoupler
- User's Guide
- Carry Case
- Test Leads (2)
- Quick Start

Features

- Measures voltage, resistance, capacitance, frequency, temperature, and more
- Measures high current by electromagnetic induction
- True-RMS accuracy
- Easy-open tapered jaws
- Auto-polarity and overload indication

⚠ Caution: To reduce the risk of shock and injury, please read all cautions, warnings, and safety instructions before use.

① Install batteries

Your multimeter requires two AA batteries (not included) for power. When  displays, replace the batteries.

1. Set the function switch to **OFF** and disconnect the test leads.
2. Remove the screw on the back using a phillips screwdriver to open the battery compartment cover. Install the batteries matching the polarity symbols (+ and -) marked inside.
3. Replace the cover and secure it with the screw.



 **Warning:** To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover, and do not operate your meter until the battery cover is in place and fastened securely.

 Battery Notes:

- Dispose of batteries promptly and properly. Do not burn or bury them.
- Use only fresh batteries of the required size and type.
- Do not mix old and new batteries, different types of batteries (alkaline, or rechargeable), or rechargeable batteries of different capacities.
- If you do not plan to use the meter for a long time, remove the batteries. Batteries can leak chemicals that can damage electronic parts.

② Connect the test leads

1. Remove the rubber caps from the test leads.
2. Plug the black lead into the **COM** jack and the red lead into the **V/Ω** jack.

After use, wrap the leads neatly and store them in the carry case.

③ Set the function switch

800A, **400A**, **40A** Measures DC/AC amperage

TEMP Measures temperature

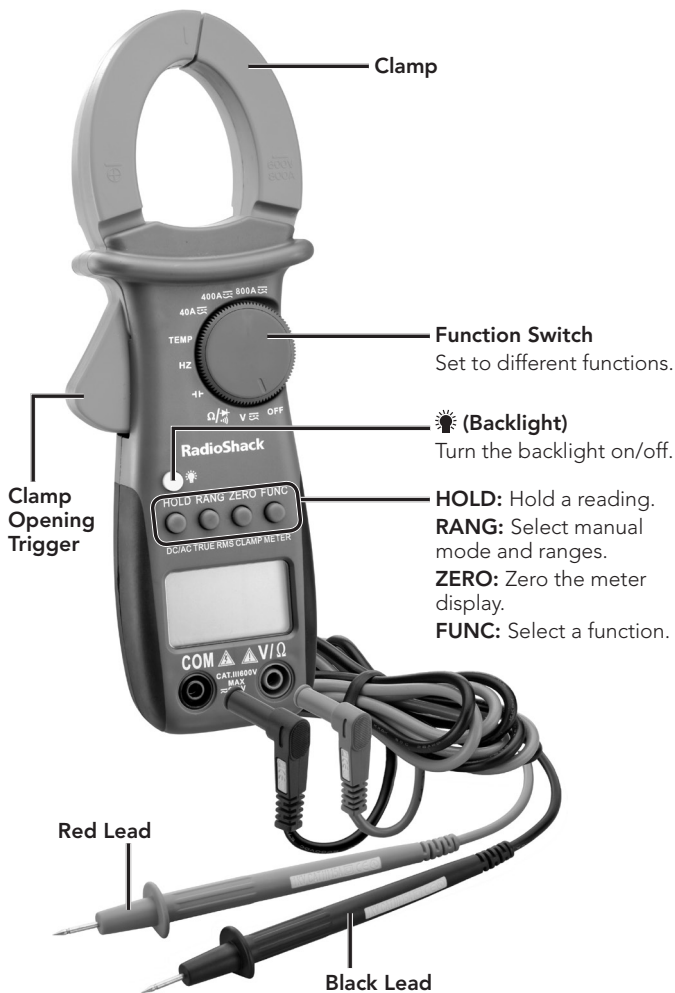
Hz Measures frequency

⎓ Measures capacitance

Ω/⤵/🔊 Measures resistance, diodes, and continuity

V Measures AC and DC voltages

OFF Turns the meter off



④ Select ranges (optional)

1. Set the function switch to a position.
2. Press **FUNC** to cycle through and choose a function (such as Ω). The meter starts in auto mode. The word **AUTO** displays, and the meter automatically selects a range according to the rating of the circuit under test.
Press **RANG** to enter manual mode. **AUTO** disappears.
3. In manual mode, press **RANG** to select a range. The measuring unit and decimal point position together denote a range. Refer to the range display table on this page for range indications on the display.

To return to auto mode, press and hold **RANG** for 2 seconds.

⑤ Observe display readings

Ranges appear on the display as indicated below:

Position	Range	Display	Position	Range	Display
V $\overline{\sim}$	600 DCV	0000 V	V $\overline{\sim}$	600 ACV	0000 V
	400 DCV	000.0 V		400 ACV	000.0 V
	40 DCV	00.00 V		40 ACV	00.00 V
	4 DCV	0.000 V		4 ACV	0.000 V
	400 DCmV	000.0 mV			
800A $\overline{\sim}$	800 DCA	0000 A	+ $\overline{\sim}$	4 nF	00.00 nF
	800 ACA	0000 A		40 nF	000.0 nF
400A $\overline{\sim}$	400 DCA	000.0 A		400 nF	000.0 nF
	400 ACA	000.0 A		4 μ F	0.000 μ F
40A $\overline{\sim}$	40 DCA	00.00 A		40 μ F	00.00 μ F
	40 ACA	00.00 A		100 μ F	000.0 μ F

Position	Range	Display	Position	Range	Display
TEMP	-20~760 °C/ -4~1400°F	(-)00000 °C/ (-)00000 °F		40 MΩ	00.00 MΩ
				4 MΩ	0.000 MΩ
Hz	40 Hz	00.00 Hz		400 KΩ	000.0 KΩ
	400 Hz	000.0 Hz		40 KΩ	00.00 KΩ
	4 KHz	0.000 KHz		4 KΩ	0.000 KΩ
	40 KHz	00.00 KHz		400 Ω	000.0 Ω
	400 KHz	000.0 KHz			
	4 MHz	0.000 MHz			
	10 MHz	00.00 MHz			

Using Your Multimeter

- Always set the function switch to **OFF** when you are not using the meter. Your meter automatically turns off after about 15 minutes when left unattended.
- To deactivate auto power-off, press and hold **HOLD** or **FUNC** and turn on the meter. To activate auto power-off, turn off the meter and turn on again.
- If **OL** displays, it indicates the measured value exceeds the range rating. Try a higher range. This is normal when you measure resistance or a diode or when you keep the test leads disconnected. If you are measuring voltage or current when **OL** displays, disconnect the test leads from the circuit immediately.
- For any function, press **ZERO** to remove zero offset before taking measurements so you get exact measured values.

Measuring DC/AC Voltage

The reading may be unstable in areas of high electromagnetic interference or other noise sources. When taking measurements using the 400V DC and 4V AC ranges, **OL** may not display if

you touch the test leads together. This is normal for a high impedance instrument because of internal and external interference.

1. Set the function switch to **V** $\overline{\sim}$.
2. Press **FUNC** to select DC voltage (**DC V** displays) or AC voltage (**AC V** displays).
3. Connect the test leads to the circuit under test. For DC voltage, red = higher potential point, black = lower potential point; otherwise you get a negative value (– appears before readings).
4. Power on the circuit and read the DC or AC voltage.

Warning: Never clamp a test lead to a hot wire (usually red, black, or blue in AC wiring circuits). If one lead is clamped to a hot wire and you touch the meter's other lead, you could receive an electric shock.

Caution: When measuring high-voltage circuits, do not position both test leads at once. First, connect the black test lead to the circuit's neutral or ground lead. Then, using one hand only, probe for voltages with the red test lead. This helps prevent you from accidentally touching a hot wire.

Measuring DC/AC Current

1. Remove the test leads from the meter.
2. Set the function switch to **800A** $\overline{\sim}$, **400A** $\overline{\sim}$, or **40A** $\overline{\sim}$. If you are unsure of the amperage of the circuit under test, set to **800A** $\overline{\sim}$ first, then try the lower ranges.
3. Press **FUNC** to select the AC current (**AC A** displays) or DC current (**DC A** displays). For DC current, press **ZERO** to zero the meter display first.



4. Press the clamp trigger to open the clamp. Enclose one conductor or wire with the clamp. For best results, center the conductor or wire in the clamp.
5. Read the amperage.



Caution: Always connect the leads to your multimeter before you clamp them to a wire carrying current, and always remove the leads from a wire carrying current before you disconnect them from the multimeter.



Note: When measuring DC current, let the front side of the meter face the positive pole of the circuit under test. Otherwise you get negative values.

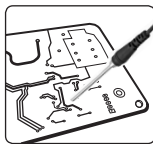
Measuring Frequency

You can measure frequencies from 40Hz to 10MHz. Refer to the frequency ranges listed in the table on page 5.

1. Set the function switch to **Hz**.
2. Touch the black test lead to a ground reference for the signal, and the red test lead to the signal source.
3. Read the measurement.

Measuring Temperature

1. Set the function switch to **TEMP**.
2. Plug the thermocoupler's black lead into the **COM** jack and its red lead into the **V/Ω** jack.
3. Touch the probe of the thermocoupler to the device under test. Wait until the reading stabilizes.
4. Press **FUNC** to select Celsius (°C) or Fahrenheit (°F). Read the measurement.





Notes:

- Apply coolant to the metal head of the thermocoupler's probe to more quickly detect the temperature of the device it touches.
- When the device temperature is above 60°C, remove the thermocoupler once the reading stabilizes. The thermocoupler cannot work in high temperature for long.

Measuring Capacitance

You can measure capacitance from 1nF to 100μF. Refer to the capacitance ranges listed in the table on page 5.

1. Set the function switch to **1F**.
2. Power off the circuit under test and discharge all capacitors.
3. Connect the test leads to the capacitor, or remove one of the leads of the capacitor from its circuit and touch the test leads across the capacitor, matching the polarities of the capacitor.
4. Read the measurement.

Measuring Resistance

1. Set the function switch to **Ω/⚡/∞**.
2. Press **FUNC** to select the resistance function (**MΩ** displays).
3. Power off the circuit under test and discharge all capacitors.
4. Connect the test leads across the circuit. Or remove one of the component's leads from its circuit and touch the test leads across the component.
5. Read the measurement.



Notes:

- Do not touch or hold the test leads with your hands during measurement or reading.
- The response time is 10 seconds for 4MΩ and 40MΩ, and 4 seconds for other ranges.
- The voltage in the circuit under test is ≤0.4V.

Checking Diodes

You can check diodes, transistors, and other semiconductors for opens, shorts, and normal operation, and determine the forward voltage and polarity for diodes. You can also check LEDs.

1. Set the function switch to $\Omega/\rightarrow/\bullet$.
2. Press **FUNC** to select the diode function ($\rightarrow$ displays).
3. Power off the device under test and discharge all capacitors.
4. Touch the test leads across the device, or remove one of the component's leads from its circuit and touch the test leads across the component. Observe the first reading.
5. Reverse the test leads and observe the second reading.
 - If one reading shows a value (typically 0.400V to 0.900V) and the other shows ∞ , then the device is good. As the meter shows a value reading, the anode (+) side is where the red test lead is connected.
 - If ∞ displays for both readings, then the device is open.
 - If both readings show small values or zero, then the device is shorted.



Notes:

- The values that display during the diode check show the actual forward voltage (Max. 2.0V). If the voltage exceeds 2.0V, then ∞ displays, meaning this meter cannot check the diode.
- When you check a silicon-type semiconductor, the values might vary according to the temperature.

Checking Continuity

You can check for open or shorted electric circuits.

1. Set the function switch to $\Omega/\rightarrow/\bullet$.
2. Press **FUNC** to select the continuity function ($\bullet$ displays).
3. Power off the circuit under test and discharge all capacitors.

4. Touch the test leads across the circuit. If the circuit resistance is less than 40Ω , meaning the circuit is continuous or shorted, the buzzer sounds.

Additional Information

Safety Precautions

- Never exceed these limits when using the meter:

Current:	800A DC/AC
Voltage:	600V DC/AC
Resistance, capacitance, frequency, and diode:	250V DC/AC
Temperature:	60V DC/24V AC
- Do not measure voltage if the voltage on the **COM** input jack exceeds 600V above earth ground.
- Do not measure current of circuits whose voltage is greater than 500V above earth ground.
- Never connect the meter leads across a voltage source while the function switch is in the resistance or diode mode. Doing so can damage the meter.
- Do not use the meter if you are unfamiliar with electric circuits and testing procedures.
- This meter is for measuring household AC voltages. Do not try to measure 3-phase, line-to-line voltages. Use extreme caution when measuring current and voltage in commercial electrical panels; always wear protective leather gloves, a face shield, and fireproof arm and upper body protection.
- To reduce the risk of fire or shock hazard, do not expose the meter to rain or moisture. It is for indoor use only.
- Use extreme caution when working with voltages above 30V. Always power off the circuit under test before you connect the test leads to high-voltage points.
- Never try to probe with both test leads at the same time or hold both test leads in one hand.

- Always discharge any capacitors of the circuit under test before you attach the test leads.
- Because many AC/DC sets have a potentially hot chassis, be sure the top of your workbench and the floor underneath it are made of non-conductive materials.
- Use the meter as instructed here, or the protection it provides may be impaired. To avoid damage, have the meter repaired by qualified service personnel only.

Special Panel Markings

MAX $\approx 600V$ 	To avoid electric shock and damage to the meter, do not connect the common input terminal (the COM jack) to any source that exceeds 600V with respect to ground.
	Caution: RISK OF ELECTRIC SHOCK! Refer to the complete operating instructions.
	Caution: Be extremely careful when taking high-voltage measurements. DO NOT TOUCH TERMINALS OR TEST LEAD ENDS.
CAT III 600V	This equipment is rated for installation category III.



Notes:

- *This meter is in accordance with the requirements for double insulation to IEC1010-1 (2001): EN61010-1 (2001) Overvoltage, Category III 600V and Category II 1000V, Pollution Degree 2.*
- *The UL mark does not indicate that this product has been evaluated by Underwriters Laboratories for the accuracy of its readings.*

Specifications

Power SupplyTwo AA batteries (not included)

Input Impedance $10M\Omega$ (DCV/ACV)

Diode Check Current: $<0.3mA$, open circuit voltage: $<3V$ DC (typical)

Continuity Beeper Continuous (short): $\leq 40\Omega$, test current: $<0.5mA$

Operating Temperature	41 to 104°F (5 to 40°C)
Operating Altitude	<7000 Ft. (2135 m)
Storage Temperature	-4 to 140°F (-20 to 60°C)
Relative Humidity.....	80% (Max.) for temperatures up to 87.8°F (31°C), decreasing linearly to 50% at 104°F (40°C)
Dimensions (HWD)	8¼ × 3 × 1½ inch (210 × 76 × 38mm)
Weight (with battery)	10.3 oz (291 g)

Accuracy

DC Voltage (Input impedance: 10MΩ in parallel with <50pF, normal mode rejection ratio: >60dB @ 60Hz, response time to rated accuracy: <4 seconds, Max. input: 500V)	(400mV) ±0.5% of reading, ±8 in last digit (4V, 40V, 400V) ±0.5% of reading, ±8 in last digit (600V) ±0.7% of reading, ±8 in last digit
AC Voltage	(4V) ±1.8% of reading, ±8 in last digit (40V, 400V, 600V) ±1.8% of reading, ±8 in last digit
DC Current	(800A) ±3.0% of reading, ±8 in last digit (400A, 40A) ±2.8% of reading, ±8 in last digit
AC Current	(800A) ±3.0% of reading, ±8 in last digit (400A, 40A) ±2.8% of reading, ±8 in last digit
Temperature.....	(°C/°F) ±5 in last digit
Frequency.....	(10MHz, 4MHz, 400KHz, 40KHz, 4KHz, 40Hz) ±0.1% of reading, ±2 in last digit (400Hz) ±0.1% of reading, ±3 in last digit
Capacitance	(400nF, 40nF, 4nF) ±5.0% of reading, ±10 in last digits (40μF, 4μF) ±8.0% of reading, ±10 in last digit
Resistance.....	(40MΩ) ±2.5% of reading, ±5 in last digit (4MΩ, 400KΩ, 40KΩ, 4KΩ, 400Ω) ±1.0% of reading, ±5 in last digit

Frequency Sensitivity

400KHz, 40KHz, 4KHz, 400Hz, 40Hz	50 mVrms
4MHz.....	100 mVrms

Specifications are subject to change and improvement without notice. Actual product may vary from the images found in this document.

Limited Warranty

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Printed 07A10
in China 22-172